

Futures

MPP Visualization

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Possible Paths / Strategies

Three Scenarios

- Parallel rendering
- Remote graphics / servers
- Video servers

Parallel Graphics

Issues

- + no need to move data off machine
- have to keep data on machine
- + Fast rendering?
- Not cost effective?
- little interactivity (time sharing)
- + a lot of research in area
- little truly useful research
- little access to millions of \$\$\$ worth of software
- no standards

Remote Graphics (Server concept)

Issues

- + lots of current software**
- need to move data off machine**
- + cost effective hardware?**
- + interactive single user**
- data too large for interactivity**
- + high-end visualization machines exist**
- graphics servers are single user and console based**
- + work progressing on distributed graphics**

Remote Graphics (many workstations)

Issues

- + readily available**
- toys**
- + lots of current software**
- need to move data off machine**
- + mix 'n match between high-end / low-end**

Video Servers

Issues

- + current market / driving force**
- + immediate utility**
- need 12Kx12K panable zoomable movies**
- limited pick-n-query**

Bogus Observations

If you believe any of this its your fault

- Parallel graphics will take a lot of work - too much work
- Time-sharing will always kill the interactivity
- No decent graphics server exists - or will exist
- Physicists want / need pick-n-query
- An Amiga won't help
- Too much data to do anything anywhere at any time.

Critical Paths (Parallel Graphics)

Standards

- Embedded parallel z-buffering (or something better) within PHIGS, PEX and/or OpenGL
- Global memory based frame buffer => contention
- Distributed frame buffer => message passing
- “Pixel Planes” architecture type algorithms
- Workable user interface / interactions

Critical Paths (Remote Graphics)

Data Compression

- Are billions of zones needed for the physics, or the analysis?
- Compress data intelligently by a factor of 1000 - lossy
- Include hierarchical information to allowing interactive browsing and adaptive refinement.
- Include structured information to easily select regions

Critical Paths (Visualization Server)

Render to Pixmap or Video Stream

- Departmental class machine accessible from any office
- Need architecture that allows a path through the graphics hardware and then out to the network.
- Video network protocols - Xlib like

Multi-user Based

- Time slicing ala IBM
- Multiple frame buffers

Critical Paths (Video Servers)

Algorithms

- View independence - ala Virtual Museum
- Quantifiable (revertable) color mappings
- Multi-variable imagery with comprehension
- Panning and zooming very large compressed movies - also a hardware problem
- Intelligent algorithms to follow interesting areas - color mappings, slice planes, contours, etc.
- Dual viewing / movie building - Mac in office, and video projector down the hall.

Conclusions

Help!!!